

# Variant Virus Infections in People

## Interim Guidance for Clinicians

August 15, 2016

### Background

Influenza A viruses circulating in swine that have infected humans are referred to as “variant” viruses and denoted with a letter “v”. Human infections with H1N1v, H3N2v and H1N2v viruses have been detected in the United States.

Most commonly, human infections with variant viruses occur in people with exposure to infected swine (e.g., children near swine at a fair or workers in the swine industry). There have been documented cases of multiple people becoming sick after exposure to one or more infected swine and also rare cases of limited spread of variant influenza viruses from person-to-person. The vast majority of human infections with variant influenza viruses do not result in person-to-person spread. However, each human infection with a swine influenza virus should be fully investigated to be sure that such viruses are not spreading in an efficient and ongoing way in humans and, if infected animals are identified, to limit further exposure of humans to these animals.

### Clinical Presentation and Risk Groups

Clinical characteristics of human infections with variant viruses generally have been similar to signs and symptoms of uncomplicated seasonal influenza, including fever, cough, pharyngitis, rhinorrhea, myalgia, and headache. Vomiting and diarrhea also have been reported in some infections in children. Milder clinical illness is possible, including lack of fever. The duration of illness appears to be similar to uncomplicated seasonal influenza, approximately 3 to 5 days. While assumed to be similar to seasonal influenza virus infection, the duration of viral replication and possible infectiousness of variant virus infection has not been studied.

Exacerbation of underlying conditions (e.g., asthma) has occurred. The same people at increased risk for complications of seasonal influenza are likely at high risk for serious complications from variant virus infection, including children younger than 5 years, pregnant women, people 65 years and older, those who are immunosuppressed, and persons with chronic pulmonary, cardiac, metabolic, hematologic, renal, hepatic, neurological or neurodevelopmental conditions, as well as those with other co-morbidities, including extreme obesity.

### Clinical Diagnosis

Variant virus infection cannot be distinguished by clinical features from seasonal influenza virus infection, or from infection with other respiratory viruses that can cause influenza-like illness (fever and either cough or sore throat). Therefore, the key to suspecting variant virus infection in an ill patient is to elicit an epidemiological link to recent swine exposure in the week prior to illness onset. Exposure can be defined as follows:

- Direct contact with swine (e.g., showing swine, raising swine, feeding swine, or cleaning swine waste)
- Indirect exposure to swine (e.g., visiting a swine farm or walking through a swine barn), especially if swine were known to be ill; or
- Close contact (within 2 meters or approximately 6 feet) with an ill person who had recent swine exposure or is known to be infected with a variant virus.

For any ill person with an exposure as defined above, respiratory samples should be taken for testing. Clinicians should obtain a nasopharyngeal swab or aspirate (or a combined nasal swab and throat swab), place the swab or aspirate (or combined specimen) into viral transport medium, and contact their state or local health department to arrange transport and request a timely diagnosis at a state public health laboratory. Only CDC and state public health laboratories can confirm variant virus infections. If testing is also going to be done at the hospital or clinic, the specimen should be split or two specimens should be taken so that one can be immediately sent to the health department for testing.

### Laboratory Diagnosis and Test Interpretation; Hospital and Clinical Laboratories

Antigen detection tests, such as commercially available rapid influenza diagnostic tests (RIDTs) and immunofluorescence assays [e.g. direct fluorescent antibody staining (DFA)] may detect variant virus in respiratory specimens, although some RIDTs may not detect these viruses (i.e., false negative result). A false negative result also can occur with other influenza viruses. While some variant virus infections have tested positive by RIDTs, other confirmed variant virus infections have tested negative by RIDTs.

There are a variety of commercial molecular assays, including RT-PCR assays, that can detect influenza viruses. All of the available assays are likely to detect influenza A virus infection and, in general, are more sensitive and specific than RIDTs. However, commercially available molecular assays cannot differentiate variant viruses from seasonal influenza A viruses, and the sensitivity and

specificity of molecular assays to detect variant viruses are not known. Some medical center laboratories may use non-commercially available molecular assays for influenza (“home brews”); the sensitivity and specificity of home brew molecular assays to detect variant viruses are not known.

## Clinician Reporting

Clinicians should notify the local public health department of any suspected variant virus infections as soon as possible. The health department can arrange for appropriate testing of clinical specimens at the state public health laboratory.

## Clinical Management

Clinical management of variant virus infection is similar to management of seasonal influenza virus infections. Patients with uncomplicated variant virus infection can be managed on an outpatient basis, with close monitoring for clinical progression and development of complications. Early neuraminidase inhibitor antiviral treatment is indicated for all hospitalized patients, severe and progressive illness, and for any high-risk patients with suspected or confirmed variant virus infection. Management of mild to moderate complications such as non-severe exacerbation of underlying co-morbidities may be managed on an outpatient basis. However, hospitalization may be required for severe complications or clinical progression to severe illness. At hospital admission, antiviral treatment should be started as soon as possible for previously untreated patients. If secondary invasive bacterial infection is suspected, appropriate empiric antibiotic therapy should be started promptly. Additional care includes supportive care of potential complications (e.g., supplemental oxygen for hypoxia; mechanical ventilation for respiratory failure; vasopressors for shock; renal replacement therapy for renal failure).

## Antiviral Treatment

Variant viruses tested to date are susceptible to the neuraminidase inhibitor drugs oseltamivir, peramivir and zanamivir. These drugs can be prescribed to treat variant virus infections. However, most variant viruses are resistant to the antiviral drugs amantadine and rimantadine; therefore, amantadine and rimantadine should not be prescribed.

- Oral oseltamivir, inhaled zanamivir, or IV peramivir are recommended for treatment of variant virus infections.
- For persons suspected of having a variant virus infection and who are hospitalized, have severe or progressive illness, or are in a high-risk group, empiric antiviral treatment should be started as soon as possible, without waiting for the results of influenza testing.
- For hospitalized patients and patients with severe or complicated illness, treatment with oral or enterically administered oseltamivir is recommended. Inhaled zanamivir is not recommended because of the lack of data for use in patients with severe influenza disease. There also is insufficient data regarding efficacy of intravenous peramivir for hospitalized patients.
- While early antiviral treatment (within 48 hours of illness onset) is generally most effective, antiviral treatment may still be effective when administered later in patients with moderate and severe illness.
- Antiviral treatment with oral oseltamivir, inhaled zanamivir, or IV peramivir is recommended for outpatients with suspected influenza, including variant virus infection, if they are in a group considered to be at high risk for complications from influenza.
- Antiviral treatment also can be considered for any previously healthy, symptomatic outpatient not at high risk with confirmed or suspected variant virus infection on the basis of clinical judgment, if treatment can be initiated within 48 hours of illness onset.

Antiviral treatment recommendations for variant virus infection are based upon those for seasonal influenza (Antiviral Drugs).

## Antiviral Chemoprophylaxis

Antiviral chemoprophylaxis (before or after swine exposure) is not recommended, including for persons who are at high risk for influenza complications. If such high-risk persons become ill, they should seek medical care as soon as possible and early antiviral treatment should be started if influenza, including variant virus infection, is suspected.

In most instances, variant influenza viruses have not spread easily or sustainably from person to person. Please see chemoprophylaxis recommendations for seasonal influenza at Influenza Antiviral Medications: Summary for Clinicians.

## Over-the-Counter Medications

Clinicians should remind parents that aspirin or aspirin-containing products should not be given to children with influenza-like illness, including persons who are suspected of having variant virus infection, because of the risk of Reye syndrome.

## Infection Control; Patient Care

Limited, non-sustained human-to-human transmission of some variant viruses has been reported. While limited data are available, the risk of human-to-human transmission is thought to be low. However, it is assumed that variant viruses may be transmitted from

person-to-person. Therefore, in health care settings, infection control recommendations are the same as for seasonal influenza, including standard and droplet (i.e., health care provider wears a facemask) precautions. For aerosol-generating procedures, a fit-tested N95 respirator or equivalent should be used. See Prevention Strategies for Seasonal Influenza in Healthcare Settings and also Infection Control in Health Care Facilities.

### **Infection Control; Specimen Collection**

Health care personnel who collect respiratory specimens from ill persons for influenza testing should follow standard and droplet precautions, as recommended for patient care.

### **Caring for Someone at Home**

Ill persons who are suspect or confirmed variant virus infections and who do not require hospitalization should be isolated at home away from other family members as much as possible. Household members who are at increased risk for influenza complications should avoid coming within 2 meters (or approximately 6 feet) of ill persons.

For seasonal influenza guidance, see The Flu: Caring for Someone Sick at Home at <http://www.cdc.gov/flu/consumer/caring-for-someone.htm>.

